SUMMARY

The U.S. Department of Energy (DOE) proposes to implement a contract with BNFL Inc. (BNFL) to construct and operate the proposed Advanced Mixed Waste Treatment Project (AMWTP) facility at the Idaho National Engineering and Environmental Laboratory (INEEL). The AMWTP, as proposed by BNFL, would retrieve, sort, characterize, and treat approximately 65,000 cubic meters of transuranic (TRU), alpha-contaminated LLMW (alpha LLMW), low-level mixed waste (LLMW), and waste currently stored at the INEEL Radioactive Waste Management Complex (RWMC), and package the treated waste for shipment offsite for disposal. The AMWTP facility could also treat an additional 120,000 cubic meters of waste from INEEL and other DOE sites. A summary of the waste volumes by waste categories that are being considered for treatment at the proposed AMWTP facility currently stored at the RWMC is presented in Table S-1.

The INEEL is located on 569,135 acres west of the City of Idaho Falls in southeast Idaho. The site sits on the Eastern Snake River Plain and is bordered by the Bitterroot, Lemhi, and Lost River mountain ranges. The land comprising the INEEL is used to support DOE facility and program operations and as safety-and-security zones around facilities. About 2 percent of the total INEEL area (11,400 acres) is used for facilities and operations. INEEL operations are performed within the site's primary facility areas which occupy 2,032 acres. The remaining land (567,103 acres) is largely undeveloped and used for environmental research, ecological preservation, and livestock grazing.

INEEL is one of DOE's primary centers for research and development activities on reactor performance, materials testing, environmental monitoring, waste processing, and breeder reactor development. In addition to nuclear reactor research, other INEEL facilities support reactor operations; processing and storage of high-level waste, LLMW, and low-level waste; and disposal of low-level waste and also storage of TRU waste generated by defense program activities.

Condition of Waste at the Idaho National Engineering and Environmental Laboratory

The 65,000 cubic meters of the INEEL waste described above is TRU, alpha LLMW, and LLMW waste stored at the RWMC. Of this amount, approximately 52,000 cubic meters (80 percent) is in wooden boxes and metal drums that were stacked on an asphalt pad and covered with tarps, plywood, and then soil to form an earthen berm. The earthen-covered berm is enclosed within a metal building called the Transuranic Storage Area Retrieval Enclosure (TSA RE), a *Resource Conservation and Recovery Act* (RCRA) interim status facility. Approximately 13,000 cubic meters of the waste (the other 20 percent) is stored in adjacent RCRA-permitted facilities at the RWMC. The drums and boxes have a 20-year design life and were not intended to provide permanent containment of the waste. The drums and boxes have been in the earthen berm since 1970 and are subject to breaching and failure through corrosion or decomposition, which results in the potential for the wastes to be released to the environment.

PROJECT HISTORY

DOE has been storing TRU waste at the INEEL since the early 1980s. In the early 1990s, DOE considered plans to retrieve the 52,000 cubic meters of stored waste from the earthen covered berm, segregate the alpha LLMW from the TRU waste, and build and operate a treatment facility. Alpha LLMW would be treated to comply with RCRA land disposal restrictions (LDR) requirements and the TRU waste

would be treated to meet the Waste Isolation Pilot Plant (WIPP) waste acceptance criteria (WAC). (WIPP is a disposal facility for TRU waste that DOE has developed near Carlsbad, New Mexico.) Additional RCRA storage modules were also planned for the retrieved and/or treated waste.

Table S-1. Summary of mixed waste volume by waste category.[a]

Waste category	Volume (cubic meters)
Ceramic/Brick Debris	290
Graphite	490
Heterogeneous Debris	3,655
Heterogeneous Debris and Mixed Debris	165
Inorganic Debris	4,930
Inorganic Homogeneous Solids	8,570
Metal Debris	15,835
Metal Debris and Heterogeneous Debris	80
Organic Debris	800
Organic Homogeneous Solids	1,695
Paper/Rags/Plastic/Rubber	14,480
Remote Handled	135
Soils	250
Special Case Waste	80
To Be Determined	6,275
Total	57,230

[a.] The sum of the waste in this table is less than 65,000 m^3 because: 1) this list includes only mixed waste (hazardous and radioactive) and therefore does not include waste to be treated that is radioactive only; and 2) 65,000 m^3 is an estimate from 1988 that was developed before the inventory included in Appendix F was available.

In 1992 and 1993, DOE requested studies to examine the potential for private sector treatment of alpha LLMW. These studies concluded that cost savings could be achieved and the schedule shortened by 7 years from that proposed by the Management and Operations (M&O) contractor if treatment of the 65,000 cubic meters of waste were privatized. As a result, DOE issued a Scope of Work for a "Feasibility Study of Treatment Services for Alpha-Contaminated Mixed Low Level Waste." Three private sector teams provided feasibility studies. After extensive evaluation by DOE, a decision was made to pursue the procurement of treatment, assay, and characterization services for alpha LLMW and TRU mixed waste from the private sector. At the same time, information from the feasibility studies was provided for analysis in the *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Environmental Impact Statement* (DOE INEL EIS). In the DOE INEL EIS Record of Decision (ROD), DOE decided to construct treatment facilities at INEEL necessary to comply with the *Federal Facility Compliance Act*. Treatment of TRU waste at a minimum will be for the purpose of meeting the WAC for disposal at WIPP and will occur on a schedule to be negotiated with the State of Idaho.

In 1996, a final request for proposal for treatment of TRU, alpha LLMW and LLMW waste was issued. Bids were received from four teams, three of which were determined to be in the competitive range. DOE performed an extensive evaluation of the competitive bids, including consideration of the potential environmental impacts of each proposal. This evaluation was performed in accordance with DOE *National Environmental Policy Act* (NEPA) regulations (10 CFR 1021.216), the results of which are summarized in an Environmental Synopsis that was made available to the public. In December 1996, DOE awarded a three-phase contract for a treatment facility to BNFL. Phase I of the contract addresses permitting, NEPA review, and an environment, safety and health authorization process. Before deciding whether to authorize

BNFL to proceed with construction (Phase II), DOE must complete this Environmental Impact Statement (EIS). If, after completing this EIS, DOE decides not to move forward with Phase II (construction) and Phase III (operation) of the project, the contract will be terminated.

PURPOSE AND NEED FOR AGENCY ACTION

DOE currently stores approximately 65,000 cubic meters of TRU, alpha LLMW, and LLMW waste at the RWMC on the INEEL. Approximately 95 percent of this waste is classified as mixed waste which, because it contains both radioactive and chemically hazardous constituents, is regulated as hazardous waste under RCRA. Some of the wastes also contain polychlorinated biphenyls (PCB), which are regulated under the *Toxic Substances Control Act* (TSCA). These wastes (i.e., radioactive, RCRA, and TSCA wastes) are intermingled in common containers. DOE needs to place these wastes in a configuration that will allow for their disposal at the WIPP or another appropriate facility, in a manner consistent with state and federal law and consistent with the schedule contained in the October 17, 1995 Settlement Agreement/Consent Order in the case of *Public Service Co. of Colorado v. Batt* (Civil No. 91-0035-S-EJL [D.Idaho Oct. 17, 1995] [Consent Order]).

DOE also anticipates that it may need to treat up to an additional 120,000 cubic meters of these same kinds of wastes in preparation for disposal. These wastes are currently located, or may be generated, at other areas on the INEEL and at other DOE sites. Depending on future DOE decisions, the treatment of these wastes could occur at the INEEL. Any future decisions regarding transfers of TRU waste would involve revision of the TRU ROD that DOE issued on the *Final Waste Management Programmatic Environmental Impact Statement* (WM PEIS), and be subject to agreements, such as those between DOE and states, relating to the treatment and storage of TRU waste.

RELATIONSHIP TO OTHER *NATIONAL ENVIRONMENTAL POLICY ACT* DOCUMENTS

In the WM PEIS DOE evaluated the transfer of TRU wastes from sites where it may be impractical to prepare them for disposal to sites where DOE has or will have the necessary capability. The sites that could receive such shipments of TRU waste are the INEEL, Hanford Site, Oak Ridge Reservation, and Savannah River Site for treatment and interim storage, pending disposal. In a separate ROD based on the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (SEIS-II), DOE decided to dispose of defense TRU waste at WIPP and to accept for disposal grouted TRU waste, thermally treated TRU waste, or TRU waste treated by any other process that meets the WIPP WAC.

ADVANCED MIXED WASTE PROJECT FACILITY DESCRIPTION AND ALTERNATIVES

Advanced Mixed Waste Treatment Project Facility Description

The proposed AMWTP facility would be located at the RWMC in the southwestern corner of the INEEL. The AMWTP facility would be designed, built, and operated by BNFL under a privatized contract with DOE. The facility would be designed with an operational life of approximately 30 years. Operation of the facility for its entire design life would depend on DOE approval and the availability of additional waste for treatment after the 65,000 cubic meters of waste stored at the RWMC is treated. Details of the

AMWTP facility design can be found in the AMWTP RCRA Part B Permit Application located in the INEEL Technical Library at Idaho Falls, Idaho.

The proposed AMWTP facility is designed as a two-story industrial type structure with a rooftop mechanical penthouse. Overall dimensions for the first (ground) floor are approximately 210 feet x 290 feet. The general building height is about 42 feet. The facility houses approximately 60,000 square feet per floor. The rooftop mechanical penthouse encloses approximately 20,000 square feet of additional space and is about 60 feet above ground level at the eave. The facility stack extends from the north end of the building and is enclosed by a structure approximately 19 feet square. The stack (actually a windscreen enclosing seven individual flues) is about 10 feet in diameter and approximately 90 feet high.

Depending on the alternative, the AMWTP facility would include non-thermal treatment only or a combination of non-thermal treatment and thermal treatment processes. Under the Proposed Action and the Treatment and Storage Alternative, the facility would include both non-thermal and thermal treatment in the form of supercompaction, macroencapsulation, incineration, and vitrification. The Non-Thermal Treatment Alternative would include supercompaction and macroencapsulation.

Supercompaction. The supercompaction process would receive drums of sorted debris waste from the pretreatment lines where sorting, segregation, and size reduction are performed or direct feed drums from the waste receiving and staging area. The drums of waste would be punctured, then compacted by a hydraulic press that controls the shape of the resultant supercompacted puck through the use of a mold. Under this extreme pressure, gas is vented and processed through the facility air pollution control system. The volume reduction for each drum is dependent on the drum contents and packing fraction but is expected to be an average of 80 percent. The pucks would be placed into a puck drum. The puck drums would then be transferred to the macroencapsulation process. The puck drum would be the final waste form's outermost container.

Macroencapsulation. The macroencapsulation system would be used to encapsulate pucks or large pieces of metal debris not suitable for compaction. Waste would be fed into the macroencapsulation process in two forms: containers of pucks and noncompactible debris waste sent directly from the pretreatment lines.

The macroencapsulation process uses grout piped from the grout preparation area to the postcompaction glovebox, where it is poured into the puck drum, thus stabilizing the noncompactible waste or pucks in the final waste form container. Grouted drums would be lidded and allowed to cure at the drum cure area, located adjacent to the macroencapsulation process area. The drum cure area can hold up to 28 drums and has a throughput of approximately 24 drums per day. After curing for approximately 24 hours, the final waste form containers will be radioassayed and certified for final disposal. The throughput for the macroencapsulation system is approximately 20 loaded puck drums per day.

Incineration. Wastes destined for incineration would be transferred to and placed into a shredder, located at the head of the incineration process. The shredder would shred the waste and feed it into a waste hopper, from which it would be fed at a controlled rate into the incinerator. The incinerator as currently proposed is a dual-chamber auger hearth system fired by propane gas. The primary combustion chamber operates at 1,400 to 1,800^{o}F and the secondary chamber at 1,800 to 2,200^{o}F. The incinerator has a feed capacity of 650 pounds per hour of solid waste.

Vitrification. Resultant ash from the incinerator would be fed into transfer drums, which are then closed and transported to the vitrification unit feed staging area. Ash for vitrification would be placed into

a hopper and fed at a controlled rate into the vitrification unit. Glass-forming chemicals would be continuously fed with the ash to enhance the glass quality of the final waste form. A Joule melter is currently considered for the vitrification unit.

No Action Alternative

Under the No Action Alternative, existing waste management operations, facilities, and projects would continue for the management of TRU, alpha LLMW and LLMW waste, on the INEEL. The M&O contractor would continue preparation to ship TRU waste to the WIPP, using existing facilities. Retrieval of waste from the TSA RE would be initiated with re-storage of the retrieved waste in RCRA-compliant storage facilities as described in the *Environmental Assessment for Retrieval and Re-Storage of TSA Waste at the Idaho National Laboratory* (DOE/EA-0692). Shipments to WIPP would continue only as could be supported by existing facilities at the INEEL. Waste that could not meet the WIPP WAC would be returned to the storage modules on the RWMC.

Proposed Action

Under this alternative, the construction (Phase II) and operation (Phase III) of the proposed AMWTP facility would proceed in accordance with DOE's contract with BNFL. Construction of the treatment facility would begin at the permitted site, beginning with the 1999 construction season. Construction of the proposed AMWTP facility would be completed no later than December 2002. The facility would begin operation no later than March 2003. Preparation of the TRU waste for shipment to WIPP by the M&O contractor would continue in support of the milestones identified in the Settlement Agreement/Consent Order. Retrieval of waste from the TSA RE is assumed to begin in calendar year 2001. This early retrieval of waste would be necessary to establish a sufficient quantity of waste to enable efficient treatment. The AMWTP facility would be built and operated using the proposed treatment options of supercompaction, macroencapsulation, incineration, and vitrification. The facility would have sufficient operating capacity to treat approximately 6,500 cubic meters of waste per year. This alternative would accommodate the treatment of 65,000 cubic meters of waste from INEEL during the initial time frame (by 2015) and up to another 120,000 cubic meters of additional waste from the INEEL or other DOE sites by 2033 for a total of 185,000 cubic meters. Only DOE waste that meets the AMWTP facility WAC and, for non-INEEL waste that satisfies the requirements of the Site Treatment Plan Consent Order for receipt and treatment, can be accepted. A description of the proposed AMWTP facility can be found in Section 3.1 of this Draft EIS.

Non-Thermal Treatment Alternative

Under the Non-Thermal Treatment Alternative, some treatment of TRU, alpha LLMW, and LLMW waste would still occur. Wastes such as PCBs, which require thermal treatment, and other waste destined for thermal treatment (e.g., waste with high volatile organic compound content) to meet disposal criteria would be repackaged for storage. The AMWTP facility would be built at the same proposed location and operated using the treatment options of supercompaction and macroencapsulation. Facility construction would begin as identified in the Proposed Action. Completion of the facility would still occur by December 2002. The Non-Thermal Treatment facility size and layout would be the same as described in the Proposed Action. The facility would differ from the Proposed Action AMWTP facility in that the

thermal treatment processes (incineration and vitrification) and corresponding supporting equipment would not be installed. Areas of the facility described in the Proposed Action to be used for thermal treatment would be reserved for the installation of another drum or box line or for additional treatment processes that may be decided on in the future. This facility would still receive waste retrieved from the TSA RE and newly generated INEEL waste. Through characterization and sorting, the maximum amount of waste possible would be prepared for shipment to a geological repository such as WIPP. Operation of the facility would continue until 2015, at which time it is anticipated that the need for such a facility would no longer exist. Although it could receive waste from other DOE sites, treatment of non-INEEL waste in this facility is anticipated to be minimal to zero. If implemented, this alternative would not meet negotiated agreements and commitments (i.e., Settlement Agreement/Consent Order) nor would it meet regulatory requirements under RCRA and TSCA.

Treatment and Storage Alternative

Under the Treatment and Storage Alternative, the treatment facility would be built in the same location, contain the same treatment processes, and produce the same waste forms as in the Proposed Action. Thus the potential environmental impacts associated with the treatment facility are the same as the Proposed Action. The difference between this alternative and the Proposed Action is that, in the Treatment and Storage Alternative, the treated waste would not be shipped to an offsite disposal facility but, instead, would be put into RCRA-permitted storage units at the RWMC. This alternative is being evaluated as a contingency in the event WIPP is unable to receive and dispose of INEEL waste. Wastes from other DOE sites could still come to the AMWTP facility for treatment. Such offsite wastes would only come to the AMWTP facility for treatment with the approval of the State of Idaho, and the treated waste would be returned to the waste generator or sent to an approved disposal facility.

Preferred Alternative

The Preferred Alternative is the alternative that DOE believes would best fulfill its statutory mission, giving consideration to environmental, economic, technical, and other factors. DOE has identified the Proposed Action (i.e., the construction and operation of the AMWTP facility described in Section 3.3) as the preferred alternative based on information developed so far (e.g., environmental impacts from the DOE INEL EIS, feasibility studies, NEPA 216 process and procurement process).

The ROD issued after the Final EIS will describe DOE's decision regarding whether to allow BNFL to proceed with the construction and operation of the AMWTP.

PUBLIC SCOPING PROCESS

DOE published the Notice of Intent to prepare an EIS for the AMWTP in the *Federal Register* on November 20, 1997 (62 FR 62025). The public scoping period began on that day and continued through January 9, 1998. DOE invited the public to submit comments during the scoping period by postal mail, e-mail, or fax. Additionally, to increase awareness and understanding of the Proposed Action and alternatives, DOE held two facilitated public scoping workshops. The workshops provided the public with an opportunity to hear presentations, ask questions, participate in small-group discussions, and submit written and/or verbal comments on the scope of this EIS.

Forty-six attendees signed in at the Boise, Idaho, workshop held December 4, 1997, and 20 attendees signed in at the Idaho Falls, Idaho, workshop held December 9, 1997. The workshop participants submitted 55 of the 127 comment submittals received by DOE during the public scoping period. State

agency representatives, members of interested groups, and private individuals attended these workshops and submitted comments on the scope of the EIS.

Results of Public Scoping

The major issues of concern expressed by the public are summarized below.

Commentors asked that the AMWTP EIS fully describe the impacts of operating the proposed facility on air, water, soil, and vegetation including the impacts of normal and off-normal facility operations.

Some commentors made specific suggestions or posed general questions concerning various aspects of the Proposed Action. For example, they asked that DOE describe in detail the proposed treatment technologies as well as other candidate technologies that may potentially be effective but are not proposed. Some commentors questioned the need for the AMWTP while others opposed portions of the Proposed Action, such as employing incineration as a treatment technology. In several cases, commentors asked that DOE examine a wider range of storage and disposal options for treated waste.

Finally commentors wanted to know the relationship of the AMWTP EIS and other recent EISs and related DOE decisions. In many instances they requested analyses more appropriately conducted or already included in other DOE NEPA documents. Examples of these requests included analyses of the impacts of the transportation of treated waste from the INEEL to WIPP; analyses of the impacts of transportation of waste from other DOE sites to the INEEL for treatment, and the return of treated waste to the waste generating facility; and providing detailed inventories and descriptions of existing waste within the DOE Complex which might eventually be brought to the INEEL for treatment.

DOE has placed key related reference materials in the INEEL Technical Library at the DOE office in Idaho Falls, Idaho. Copies of these materials are available to the public upon request. Other DOE reference materials are routinely made available in Idaho public libraries and DOE-supported reading rooms. Additionally, DOE and the DOE Idaho Operations Office have posted many common references on the World Wide Web, at locations found through http://www.tis.eh.doe.gov/, http://doe.inel.gov, http://www.doe.gov/, and other web sites.

AFFECTED ENVIRONMENT

The INEEL sits on the Eastern Snake River Plain and is bordered by the Bitterroot, Lemhi, and Lost River mountain ranges. Local rivers and streams drain the mountain watersheds, but most surface water is diverted for irrigation before it reaches the site boundaries.

The INEEL overlies the Snake River Plain Aquifer, the largest aquifer in Idaho. Previous waste discharges to unlined ponds and deep wells have introduced radionuclides, nonradioactive metals, inorganic salts, and organic compounds into the subsurface. Because of improved waste management practices, these discharges no longer occur and groundwater quality continues to improve.

INEEL activities result in radiological air emissions; however, these are very low, less than background radiation, and well within standards.

The INEEL primarily consists of open, undeveloped land covered predominantly by sagebrush and grasslands with animal communities typical of these vegetation types. One Federal endangered and one threatened animal species have the potential for occurring, and ten animal species of special concern (State listing) occur at the INEEL. Four plant species identified as sensitive, rare, or unique by other Federal agencies and the Idaho Native Plant Society also occur at the INEEL. Radionuclides have been found above background levels in individual plants and animals adjacent to facilities, but have not been observed at the population, community, or ecosystem levels.

Land areas of importance to the Shoshone-Bannock Tribes include the buttes, wetlands, sinks, grasslands, juniper woodlands, Birch Creek, and the Big Lost River.

The INEEL has a varied inventory of cultural resources. These include fossil localities, prehistoric archaeological sites, historic sites, and facilities associated with the development of nuclear science in the United States. Similarly, because Native American people hold the land sacred, in their terms the entire INEEL is culturally important.

Most land within the site boundaries is used for grazing or is general open space. Only about 2 percent of the INEEL is used for facilities and operations, with another 6 percent devoted to public roads and utility rights-of-way. Over 97 percent of INEEL employees live in the seven counties surrounding the site. The regional economy relies on farming, ranching, and mining. The INEEL accounts for approximate 10 percent of the total regional employment.

ENVIRONMENTAL IMPACTS

The environmental impacts of the alternatives have been assessed for the INEEL and surrounding region. To aid the reader in understanding the differences in environmental impacts among the various alternatives, this section presents comparisons of the alternatives, concentrating on the major resources addressed in the EIS.

In addition to the No Action Alternative, three "action" alternatives are being considered for the AMWTP: (1) the Proposed Action, which would construct and operate the AMWTP facility and employ both non-thermal and thermal treatment processes, (2) the Non-Thermal Alternative, which would construct the AMWTP facility employing only non-thermal treatment processes, and (3) the Treatment and Storage Alternative, which would construct and operate the AMWTP facility identical to the Proposed Action, but store the treated waste at the INEEL as a contingency in the event WIPP is unable to receive and dispose of INEEL waste. Under No Action, the AMWTP facility would not be constructed.

Resource Impacts

Under No Action, there would be no impacts to land use, cultural resources, aesthetic and scenic resources, ecology, and INEEL services. There would be minor adverse impacts to geologic resources due to the extraction of aggregate, clay, sand, and soil to support environmental restoration and waste management activities. Criteria pollutant, radiological and toxic pollutant levels would be well within applicable standards. No contamination to the vadose zone would be expected to occur due to storage of hazardous and radioactive waste in the short-term. In the long-term, the potential for chronic leakage and contamination of the vadose zone would increase.

For the three "action" alternatives, construction impacts are expected to be similar and minor. An estimated 7 acres of land would be disturbed to construct the AMWTP facility. The project site is located within the RWMC and has been previously disturbed by RWMC waste management activities. Therefore, the potential to impact cultural, aesthetic and scenic, and biotic resources is not expected to be significant.

All three "action" alternatives would have the same minor adverse impacts on the geology and geologic resources at the INEEL. Construction of the AMWTP facility would require the excavation of approximately 16,000 cubic yards of material and possibly 1,033 cubic yards for expansion of the existing sewage lagoons system. Construction activities would also require approximately 20,000 cubic yards of aggregate, clay, and sand from INEEL borrow areas.

Because the Proposed Action and the Treatment and Storage Alternative would utilize the same facilities, procedures, resources, and number of workers during operation, both alternatives would produce similar environmental impacts for most resource areas. The Non-Thermal Treatment Alternative would not include incineration and vitrification as part of the facility and would have fewer air quality impacts and lower water and energy resource requirements.

Impacts to air quality were modeled for construction and operation, and results indicate minimal impacts for all three "action" alternatives. Projected criteria pollutant levels associated with each of the alternatives are well below the limits of applicable standards (<1 percent). On a comparative basis, impacts of the Proposed Action and Treatment and Storage Alternative are greater than the Non-Thermal Treatment Alternative, since the former include incinerator emissions as well as higher boiler and diesel generator emission rates.

The maximum increment of carcinogenic and noncarcinogenic air pollutants is projected to occur at the INEEL boundary, and levels of all substances would be well below the applicable standards. When the increment is combined with baseline carcinogenic and noncarcinogenic air pollutant levels, the cumulative levels would still be well below applicable standards (1 percent or less). Under the Proposed Action or Treatment and Storage Alternative, incremental levels of all carcinogenic substances would be less than 1 percent of the applicable standard. All noncarcinogenic levels would be less than 1 percent of applicable standards except for selenium, which would be about 1 percent of the standard. Carcinogenic incremental levels under the Non-Thermal Treatment Alternative would not exceed 0.1 percent of any standard, while noncarcinogenic levels would be less than 0.001 percent of applicable standards.

Water use for the Proposed Action and Treatment and Storage Alternative would be the same (2.7 million gallons per year). Electricity and propane use would also be the same, 35,022 megawatt hours per year and 925,000 gallons per year, respectively. The Non-Thermal Treatment Alternative would use less water, electricity, and propane because the AMWTP facility would not have incineration and vitrification as part of the treatment process. Water usage for the incinerator, vitrifer, and evaporators would be eliminated. Electricity requirements would be 23,980 megawatt hours per year and propane use would be 185,000 gallons per year. Electricity requirements would be well within the INEEL existing infrastructure capabilities.

Socioeconomic Impacts

Under No Action, there would be no impacts to socioeconomic or community services.

Socioeconomic impacts from construction of the AMWTP facility would be the same for all "action" alternatives. The project would generate a total of 254 jobs (125 direct and 129 indirect) in the Region of Influence (ROI) during the peak year of construction. These 254 jobs would result in an increase of less than 1 percent in the ROI employment.

Socioeconomic impacts from operation of the AMWTP facility would be the same for the Proposed Action and the Treatment and Storage Alternative, and less for the Non-Thermal Treatment Alternative. Operation of the Proposed Action and Treatment and Storage Alternative would require 146 workers and would generate 406 jobs (146 direct and 260 indirect) in the ROI. Operation of the Non-Thermal Treatment Alternative facility would requirement 133 workers and would generate 369 jobs (133 direct and 236 indirect) in the ROI. There would be no impacts to the ROI's population, housing sector, or community services from any of the alternatives.

Radiation Health Impacts

Under No Action, normal operations at INEEL would result in an estimated fatal cancer incidence range from 6.0×10^{-4} for the maximally exposed individual (MEI) involved worker, to 5.5×10^{-8} for the MEI offsite individual. The population estimated fatal cancer incidence would be 2.05×10^{-4}.

The maximum worker exposure to radiation is expected to be about equal for the Proposed Action and the Treatment and Storage Alternative (approximately 0.73 mrem/yr) and well within regulatory limits. The cancer risk would be 2.92×10^{-7}. The cumulative dose would be 0.96 mrem/yr and still well within the 5,000 mrem per year occupational dose limit. The cumulative cancer risk would be 3.84×10^{-7}. The Non-Thermal Treatment Alternative maximum worker exposure to radiation would be approximately 0.003 mrem/yr. The cancer risk would be 1.20×10^{-9}. The cumulative dose would be 0.24 mrem/yr. The cumulative cancer risk would be 9.60×10^{-8}. The risk to the workforce from these levels of radiation exposure is extremely small.

Radiation exposure to the public from normal operation of the AMWTP would be well within regulatory limits for all the "action" alternatives. The incremental dose to the public (82,000 people by 2010) within 50 miles of the RWMC for the Proposed Action and Treatment and Storage Alternative would be 0.056 person-rem/yr. The latent cancer fatalities for the Proposed Action and Treatment and Storage Alternative would be 2.8×10^{-5}. Over the projected 30-year facility operating lifetime under the Proposed Action and Treatment and Storage Alternative, the estimated population dose would be 1.6 person-rem (8.0×10^{-4} cancer fatalities).

The incremental dose to the public from the Non-Thermal Treatment Alternative would be 0.00037 person-rem/yr. The latent cancer fatalities for the Non-Thermal Treatment Alternative would be 1.8×10^{-7}. Over the projected 13-year facility operating lifetime under the Non-Thermal Treatment Alternative the estimated population dose would be 0.0043 person-rem (2.15×10^{-6} cancer fatalities).

The MEI offsite dose and resulting cancers for the Proposed Action and Treatment and Storage Alternatives would be 0.011 mrem and 5.5×10^{-5} respectively. The MEI offsite dose and resulting cancers for the Non-Thermal Treatment Alternative would be 0.0017 mrem and

8.5×10^{-10}, respectively. The added risk to the public due to these levels of radiation exposure is extremely small.

Accident Impacts

The accident scenario probability and consequences for the RWMC would not change under No Action.

Information from the AMWTP Preliminary Safety Analysis Report (Draft) was used to determine the potential impacts from accidents. A screening process was developed to identify a set of accidents that would bound the consequences of the full range of potential accidents. As a result of this screening, nine scenarios were identified as part of the design basis for the AMWTP facility.

Accident risks and consequences for the Proposed Action and the Treatment and Storage Alternative are the same. Of the accidents analyzed, the waste box drop is the scenario with the highest consequences. The potential dose to the hypothetical maximum exposed offsite individual is 6.5 mrem and the associated likelihood of contracting a fatal cancer is less than 1 in 300,000. The dose to the co-located worker is 32 mrem and the associated risk of contracting a fatal cancer is less than 1 in 75,000.

The accident with the most severe consequences from hazardous chemical release would be the lava flow over the RWMC. The chemical concentrations from nitric acid and mercury are the greatest concern. The concentration at the MEI would be 16.0 mg/m^3 for mercury, which would exceed exposure guidelines.

For the waste box spill accident the chemical concentrations at the MEI would be 3.26×10^{-7} mg/m^3 and 1.27×10^{-8} mg/m^3 for nitric acid and mercury, respectively.

Accident risks for the Non-Thermal Treatment Alternative are bounded by those for the other "action" alternatives. The absence of the incineration and vitrification processes results in some reduction of risk due to lower source terms for Am-241, mercury, and nitric acid.

Non-Radiation Health Impacts

Under No Action, no adverse health effects would occur as a result of criteria and noncarcinogenic emissions. Annual injury and illness rates for INEEL operations would not change.

The health impacts associated with potential exposure to criteria and toxic air pollutants would be well within applicable standards and regulations for all alternatives (Hazard Quotient less than one in all cases indicating that no adverse health effects would be expected). Lifetime cancer risks from concentrations of carcinogenic air pollutants were calculated. The total cancer risk under the Proposed Action and the Treatment and Storage Alternative for all nonradiological carcinogenic chemicals would be 1.3×10^{-8} (1 in 80 million) at the site boundary and 4.4×10^{-10} (1 in 2 billion) at Craters of the Moon. The total cancer risk under the Non-Thermal Treatment Alternative would be 2×10^{-9} (1in 500 million) at the site boundary and 4.5×10^{-10} (1 in 2 billion) at Craters of the Moon.

Industrial safety impacts would be the same during the 2.5 year construction period for the Proposed Action, the Treatment and Storage Alternative, and the Non-Thermal Treatment Alternative. Estimated total injuries and illnesses would be 385 and total fatalities would be approximately 1. For the

30 year operation period, the Proposed Action and Treatment and Storage Alternative would have the same number of estimated total injuries and illnesses (135) and total fatalities (0.65). The Non-Thermal Treatment Alternative would have an estimated 53 total injuries and illnesses and 0.26 total fatalities over the 13 year operation period.

Other Impacts

Under No Action, there would be no noise or traffic and transportation impacts.

For all "action" alternatives, construction noise impacts would be minor and short-term. Operational noise would be negligible since all process activities would be conducted inside the AMWTP facility.

Traffic and transportation impacts due to the three "action" alternatives would be minor and not significant. The Level-of-Service on local access highways would not change, nor would peak hourly traffic increase significantly. Construction related traffic would be the same for all the alternatives. During operation, the Proposed Action would result in slightly higher traffic volumes than the Non-Thermal Treatment Alternative and the Treatment and Storage Alternative because of the greater number of shipments to a disposal facility.

Summary of Alternatives

Based on the environmental analyses presented in this Draft EIS, the No Action Alternative would have the least short-term environmental impacts and the greatest long-term impacts. Construction impacts would be the same for all three "action" alternatives. Impacts due to facility operation would be the same for the Proposed Action and the Treatment and Storage Alternative. The Non-Thermal Treatment Alternative would have slightly less impacts to air quality, water and energy use, worker and public health, and industrial safety.